

Stanford



Martin Pfaller

Postdoctoral Scholar, Cardiology

Bio

BIO

Martin Pfaller is a postdoc in the group of Prof. Alison Marsden's Cardiovascular Biomechanics Computation Lab. His work focuses on physics-based and data-driven computational models for cardiovascular fluid and solid dynamics. Applications include congenital and acquired cardiovascular diseases, specifically the growth and remodeling of cardiovascular tissue.

Martin graduated with a PhD in Mechanical Engineering from the Technical University of Munich in 2019, working with Prof. Wolfgang Wall. His research enhanced solid mechanics models of the heart by studying the interaction between the myocardium and the pericardium. He demonstrated how projection-based model order reduction could be used to speed up model personalization from patient data, such as cine MRI or blood pressure measurements. He also showed how simulations could enable patient-specific therapy planning of radiofrequency catheter ablation in atrial fibrillation.

INSTITUTE AFFILIATIONS

- Member, Maternal & Child Health Research Institute (MCHRI)

HONORS AND AWARDS

- Travel Award, Cardiovascular Institute (CVI) (2022)
- Dissertation Award, Association of German Engineers (VDI) (2019)
- Winner Science Slam, Technical University of Munich (2017)
- Departmental Teaching Award, Technical University of Munich (2017)
- Departmental Teaching Award, Technical University of Munich (2016)
- Exchange Scholarship, German Academic Exchange Service (DAAD) (2013)
- Exchange Scholarship, Prof. Dr.-Ing. Erich Müller-Stiftung (2013)

PROFESSIONAL EDUCATION

- PhD, Technical University of Munich, Mechanical Engineering (2019)
- MSc, Technical University of Munich, Mechanical Engineering (2013)
- BSc, Technical University of Munich, Mechanical Engineering (2012)

STANFORD ADVISORS

- Alison Marsden, Postdoctoral Faculty Sponsor

LINKS

- Google Scholar Profile: https://scholar.google.com/citations?user=_SNRwoYAAAAJ
- LinkedIn: <https://www.linkedin.com/in/pfaller/>
- GitHub: <https://github.com/mrp089>

Publications

PUBLICATIONS

- **Model order reduction of flow based on a modular geometrical approximation of blood vessels.** *Computer methods in applied mechanics and engineering*
Pegolotti, L., Pfaller, M. R., Marsden, A. L., Deparis, S.
2021; 380
- **On the Periodicity of Cardiovascular Fluid Dynamics Simulations.** *Annals of biomedical engineering*
Pfaller, M. R., Pham, J., Wilson, N. M., Parker, D. W., Marsden, A. L.
2021
- **Using parametric model order reduction for inverse analysis of large nonlinear cardiac simulations** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN BIOMEDICAL ENGINEERING*
Pfaller, M. R., Cruz Varona, M., Lang, J., Bertoglio, C., Wall, W. A.
2020: e3320
- **Automatic mapping of atrial fiber orientations for patient-specific modeling of cardiac electromechanics using image registration** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN BIOMEDICAL ENGINEERING*
Hoermann, J. M., Pfaller, M. R., Avena, L., Bertoglio, C., Wall, W. A.
2019; 35 (6): e3190
- **The importance of the pericardium for cardiac biomechanics: from physiology to computational modeling** *BIOMECHANICS AND MODELING IN MECHANOBIOLOGY*
Pfaller, M. R., Hoermann, J. M., Weigl, M., Nagler, A., Chabiniok, R., Bertoglio, C., Wall, W. A.
2019; 18 (2): 503–29
- **An adaptive hybridizable discontinuous Galerkin approach for cardiac electrophysiology** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN BIOMEDICAL ENGINEERING*
Hoermann, J. M., Bertoglio, C., Kronbichler, M., Pfaller, M. R., Chabiniok, R., Wall, W. A.
2018; 34 (5): e2959
- **Multiphysics Modeling of the Atrial Systole under Standard Ablation Strategies** *CARDIOVASCULAR ENGINEERING AND TECHNOLOGY*
Hoermann, J. M., Bertoglio, C., Nagler, A., Pfaller, M. R., Bourier, F., Hadamitzky, M., Deisenhofer, I., Wall, W. A.
2017; 8 (2): 205–18
- **On the Role of Mechanics in Chronic Lung Disease** *MATERIALS*
Eskandari, M., Pfaller, M. R., Kuhl, E.
2013; 6 (12): 5639-5658